Dart Aerospace Ltd.

Date: Friday, 02/05/2008 9:13:47 AM
User: Julie Lecocq

Process Sheet

Customer	: CU-DAR001 Dart Helicopters Services	**Drawing Name**	: HIGH AFT X-TUBE 412
Job Number	: 38964		
Estimate Number	: 10559		
P.O. Number	:	**Part Number**	: D412664203
This Issue	: 02/05/2008 **S.O. No.** :	**Drawing Number**	: D412-664-243 REV D
Prsht Rev.	: NC	**Project Number**	: N/A
First Issue	: 01/05/2008 **Type** : CROSSTUBES	**Drawing Revision**	: D
Previous Run	: 37180	**Material**	:
Written By	:	**Due Date**	: 15/05/2008 **Qty:** 1 **Um:** Each
Checked & Approved By	: JLO 08.5.02		

Comment : Est Rev:E 04.02.16 Reformat; Added D3189-1 K/DS
Est Rev:F 06-03-29 Remove Coments on Pick List JLM
Est Rev:G 06.12.08 per ECN 886 EC
Est Rev:H 07-04-30 As per Rev D JLM

Additional Product

Job Number:

Seq. #:	Machine Or Operation:	Description :
1.0	DC	DOCUMENT CONTROL

Comment: DOCUMENT CONTROL
Photocopy bluefile and create labels as per PPP D412-664-203 CHG 006

2.0	PACKAGING 1	PACKAGING RESOURCE #1

Comment: PACKAGING RESOURCE #1

3.0	D412664203TRN	CROSSTUBE TURNING DETAIL

Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)
CROSSTUBE TURNING DETAIL
batch B39023 EZ 8-6-3

4.0	BENDING	BENDING MACHINE - SKIDTUBES

Comment: BENDING MACHINE
Bend tube as per Dwg D412-664-243 using CNC bender program 412-af and Folio FT010 EZ 8-6-8

5.0	QC15	DIMENSIONAL CHECK OF X-TUBES

Comment: DIMENSIONAL CHECK OF X-TUBES Scrapoll4 PTO

Form: rprocess

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: D412-664-203 PAR #: N/A Fault Category: Prod / x-tube NCR: (Yes) No DQA: [signature] Date: 08/06/05

QA: N/C Closed: [signature] Date: 08/08/10

NCR: 38964		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
08.06.04	4	Tube is 0.220" too thin and 0.160" narrow (from nominal), after bending one side	[signature] - Scrap tube 08.06.04 08/06/5 - Bend 2nd side for Bend development.		EL 8-6-4	[signature] 080605	[signature] 08/06/05	[signature] 080605

NOTE: Date & initial all entries

Date: Friday, 02/05/2008 9:13:48 AM
User: Julie Lecocq

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services **Drawing Name:** HIGH AFT X-TUBE 412

Job Number: 38964 **Part Number:** D412664203

Job Number:

Seq. #:	Machine Or Operation:	Description :
6.0	CROSSTUBES	CROSSTUBES RESOURCE 1

Comment: LANDING GEAR RESOURCE 1

1-Drill pilot holes in tube as per Dwg D412-664-243 using drill Jig DT8550 & DT8551

2-Ream hole to finish size in tube as per Dwg D412-664-243using drill Jig DT8550 & DT8551.Check dimensions between holes, both sides on both cuffs, to ensure alignment with saddle holes.

3-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D412-664-243

7.0	HAND FINISHING1	HAND FINISHING RESOURCE #1

Comment: HAND FINISHING RESOURCE #1
Chemical Conversion Coat as per QSI 005 4.1

8.0	QC3	INSPECT POWDER COAT/CHEMICAL CONVERSION

Comment: INSPECT POWDER COAT/CHEMICAL CONVERSION

9.0	QC5	INSPECT WORK TO CURRENT STEP

Comment: INSPECT WORK TO CURRENT STEP

10.0	OUTSIDE SERV.10	OUTSIDE SERVICES -skids

Comment: Sub-Contracting OUTSIDE SERVICES
Liquid Penetrant Inspection as per QSI 038Or
Issue P/O:_____LPI as per ASTM 1417
Level 2 Attach copy of NDT results to work order

scrap 011A

11.0	PACKAGING 1	PACKAGING RESOURCE #1

Comment: PACKAGING RESOURCE #1
Inspect for transit damage
Ensure copy of NDT results attached to work order.

Form: rprocess

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

QA: N/C Closed: _____ **Date:** _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	**STEP**	**Description of NC** Section A	**Corrective Action** Section B			**Verification** Section C	**Approval** Chief Eng	**Approval** QC Inspector
			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

Date: Friday, 02/05/2008 9:13:48 AM
User: Julie Lecocq

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services **Drawing Name:** HIGH AFT X-TUBE 412

Job Number: 38964 **Part Number:** D412664203

Job Number:

Seq. #:	Machine Or Operation:	Description :
12.0	QC5	INSPECT WORK TO CURRENT STEP
	Comment: Inspect for damage & ensure results are as per Dwg D412-664-203	
13.0	SPRAY PAINTING	SPRAY PAINTING
	Comment: SPRAY PAINTING 1-Prime inside and outside crosstube as per QSI 005 4.2 2-Paint outside crosstube with White Imron as per QSI 005 4.2	
14.0	QC14	INSPECT SPRAY PAINT
	Comment: Inspect Spray Paint Wrap in plastic bag to protect from scratches	
15.0	D3595063570	RUBBER CUSHION
	Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s) Rubber Cushion Batch:_____	
16.0	D2856600	Abrasion Strip
	Comment: Qty.: 1.7640 f(s)/Unit Total : 1.7640 f(s) Pick: Qty Part number Description Batch 2 D2856-600(Cut to 10.090") Abrasion Strip _____	
17.0	D28961	Support
	Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s) Pick: Qty Part number Description Batch 1 D2896-1 Support_____	
18.0	D31891	Chafing Shield
	Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s) Pick: Qty Part number Description Batch 2 D3189-1 Chafing Sheild_____	

Form: rprocess

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W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

QA: N/C Closed: _____ **Date:** _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	**STEP**	**Description of NC** Section A	**Corrective Action** Section B			**Verification** Section C	**Approval** Chief Eng	**Approval** QC Inspector
			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

Date: Friday, 02/05/2008 9:13:48 AM
User: Julie Lecocq

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services **Drawing Name:** HIGH AFT X-TUBE 412

Job Number: 38964 **Part Number:** D412664203

Job Number:

Seq. #:	Machine Or Operation:	Description :
19.0	MS2192028	Clamp(per MIL-DTL-8783C)

Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)
Pick:
Qty Part number Description Batch
4 MS21920-28 Clamp _____

20.0	MS2192030	clamp(per MIL-DTL-8783C)

Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)
clamp(per MIL-DTL-8783C)
batch:_____

21.0	CROSSTUBES	CROSSTUBES RESOURCE 1

Comment: LANDING GEAR RESOURCE 1
Assemble as per Dwg D412-664-203

1- Lightly scuff the bonded area using a 320 grit sand paper and clean the area with 41058 wash 'n' wipe

2-Install supports with magnobond as per QSI 015 Adhere for for 12 Hrs
A/R 6398 Magnobond Batch:_____
Expiry Date:_____

3-Install clamps as per Dwg D212-664-141. Torque clamps to 80-100 in lb.

22.0	QC5	INSPECT WORK TO CURRENT STEP

Comment: INSPECT WORK TO CURRENT STEP

23.0	PACKAGING 1	PACKAGING RESOURCE #1

Comment: PACKAGING RESOURCE #1
Pick Packing Kit

24.0	AN640A	Bolt

Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)
Bolt
Batch:_____

Form: rprocess

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

QA: N/C Closed: _____ **Date:** _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	**STEP**	**Description of NC** Section A	**Corrective Action** Section B			**Verification** Section C	**Approval** Chief Eng	**Approval** QC Inspector
			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

Date: Friday, 02/05/2008 9:13:48 AM
User: Julie Lecocq

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services **Drawing Name:** HIGH AFT X-TUBE 412

Job Number: 38964 **Part Number:** D412664203

Job Number:

Seq. #:	Machine Or Operation:	Description :
25.0	AN641A	Bolt

Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)
Bolt
Batch:_____

26.0	AN960JD616	Washer

Comment: Qty.: 18.0000 Each(s)/Unit Total : 18.0000 Each(s)
Washer
Batch:_____

27.0	MS21042L6	Nut

Comment: Qty.: 6.0000 Each(s)/Unit Total : 6.0000 Each(s)
Nut
Batch:_____

28.0	QC4	INSPECT 100% KITS FOR COMPLETENESS

Comment: INSPECT 100% KITS FOR COMPLETENESS

29.0	PACKAGING 1	PACKAGING RESOURCE #1

Comment: PACKAGING RESOURCE #1
Identify and pack for shipping as per PPP D412-664-203

******Ensure tube is not packaged if curing time is less than 12 hrs, see step 27 for application time & date
****

Time & date of packaging:_____

Location:_____
PPP Rev:_____

30.0	QC21	FINAL INSPECTION/W/O RELEASE

Comment: FINAL INSPECTION/W/O RELEASE

Job Completion

MF 08-06-06
CL

Form: rprocess

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

QA: N/C Closed: _____ **Date:** _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	**STEP**	**Description of NC** Section A	**Corrective Action** Section B			**Verification** Section C	**Approval** Chief Eng	**Approval** QC Inspector
			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

DART AEROSPACE LTD	Work Order:	38964
Description: Crosstube Assembly (412 High Aft)	Part Number:	D412-664-243
Inspection Dwg: D412-664-243 **Rev:** D		Page 1 of 1

FIRST ARTICLE INSPECTION CHECKLIST

[X] First Article [ ] Prototype

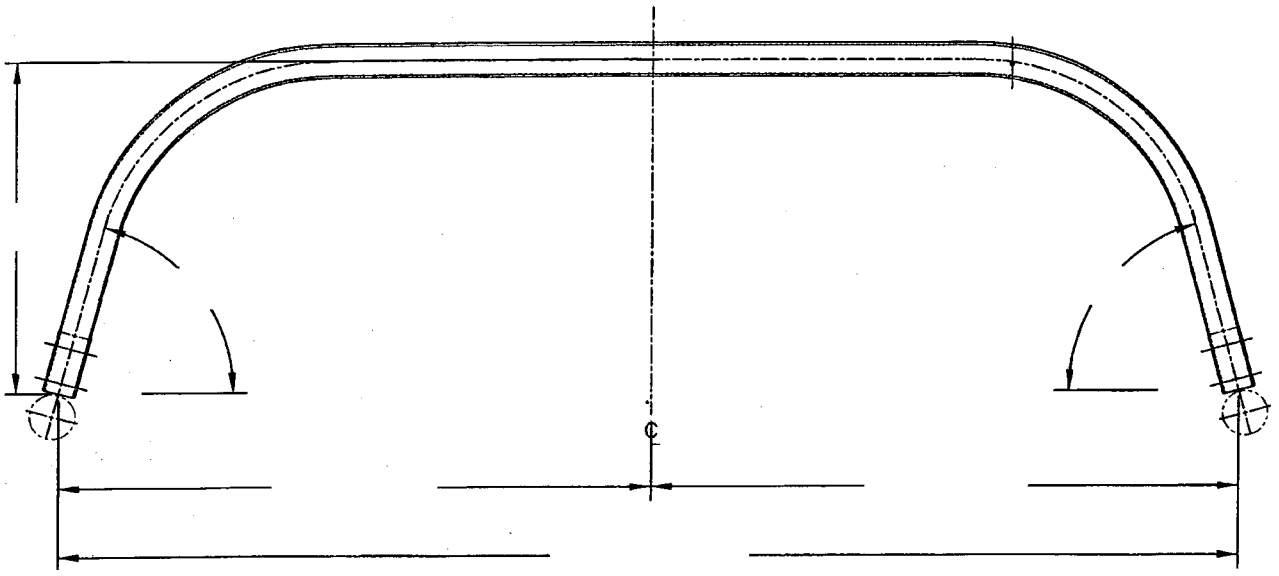
Inspection Sheet Drawing Dimension		Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	2.684	+0.005/-0.000					
	2.748	+0.005/-0.000					
	2.884	+0.005/-0.000					
	3.019	+0.005/-0.000					
	3.163	+0.005/-0.000					
	3.308	+0.005/-0.000					
	3.429	+0.005/-0.000					
	2.990	+0.005/-0.000					
	2.618	+0.005/-0.000					
	0.200	+/-0.010					
	R0.063	+/-0.010					
	R0.500	+/-0.010					
	4.971	+/-0.030					
SIDE B	2.684	+0.005/-0.000					
	2.748	+0.005/-0.000					
	2.884	+0.005/-0.000					
	3.019	+0.005/-0.000					
	3.163	+0.005/-0.000					
	3.308	+0.005/-0.000					
	3.429	+0.005/-0.000					
	2.990	+0.005/-0.000					
	2.618	+0.005/-0.000					
	0.200	+/-0.010					
	R0.063	+/-0.010					
	R0.500	+/-0.010					
	4.971	+/-0.030					
	124.09	+/-0.020					

Measured by:		Audited by:		Prototype Approval:	N/A
Date:		Date:		Date:	N/A

Rev	Date	Change	Revised by	Approved
A	04.06.16	New Issue (P/O D412-664-203)	KJ/JLM	
B	06.03.09	Dwg Rev updated	KJ/JLM	
C	07.05.08	Tolerance updated for dimension 4.971	KJ/JLM	

DART AEROSPACE LTD	Work Order:	38964
Description: Crosstube High Aft (412)	Part Number:	D412-664-203
Inspection Dwg: D412-664-243 **Rev:** D		Page 1 of 1

Required Dimension	Min	Max
Height	24.24	24.50
1/2 Span	53.59	53.85
Angle	49	52
Total Span	107.18	107.70



Comments

QC15 Inspection	
Date	

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	07.05.08	Dimensions updated per Dwg rev. D	KJ/JLM	

DART

DESIGN	DRAWN BY	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA
CHECKED	APPROVED	DRAWING NO. D412-664-243 REV. D SHEET 1 OF 3
DATE 07.03.09		TITLE CROSSTUBE ASSEMBLY (412 HI AFT) SCALE NTS

RELEASED
07.04.24

A	01.10.17	NEW ISSUE
B	05.02.04	ADD HOLES FOR COMPATABILITY WITH BHT/AA SKIDTUBES
C	06.10.27	REMOVE D2856-600-1087, ADD D2732-058 & MAGNOBOND 6398 MS21920-32 WAS MS21920-30
D	07.03.09	REMOVE D2732-058, CHANGE TO D3595-063-570

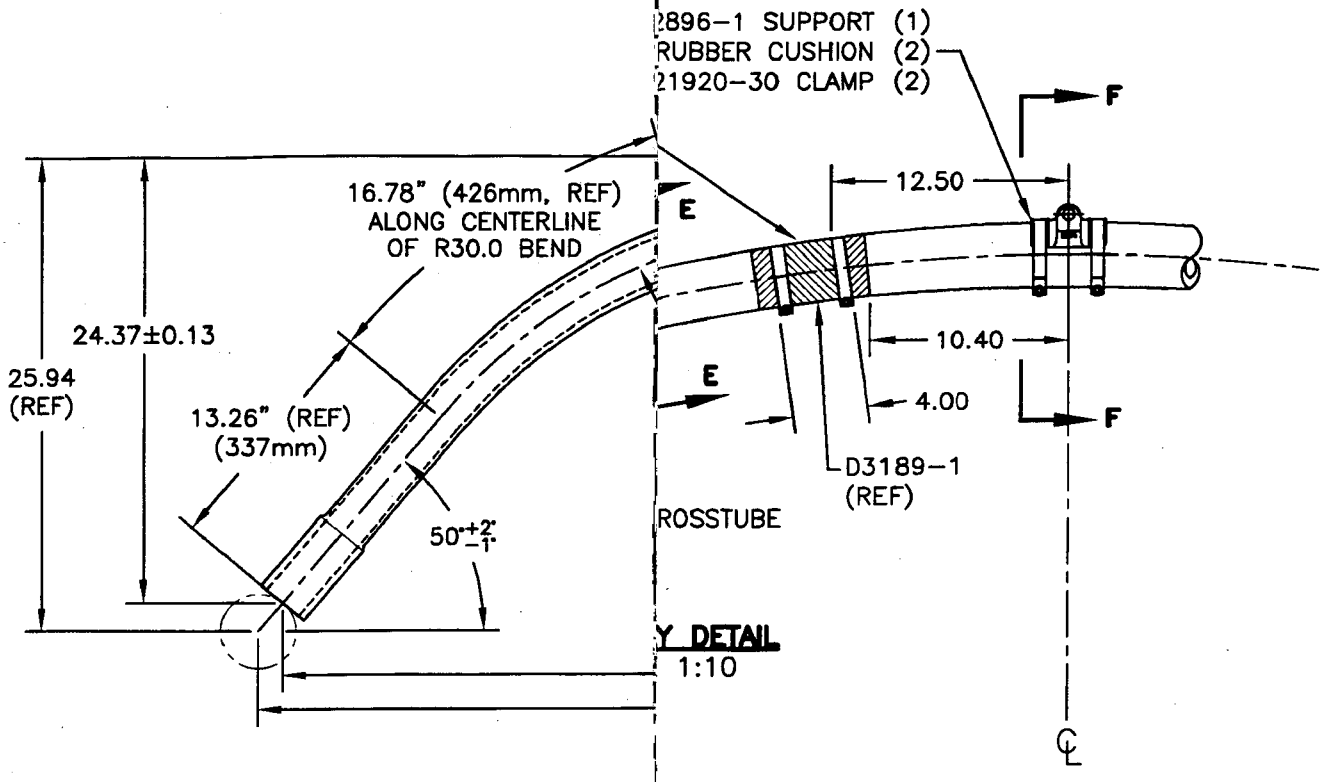
Qty	Part Number	Description
X	**D412-664-243**	**CROSSTUBE ASSEMBLY (412 HIGH AFT)**
1	D6009-129	CROSSTUBE
2	D3595-063-570	RUBBER CUSHION
1	D2896-1	SUPPORT
2	D2856-600-1009	ABRASION STRIP
4	MS21920-28	CLAMP
2	MS21920-30	CLAMP (OR MS21920-32)
2	D3189-1	CHAFING SHIELD
A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)

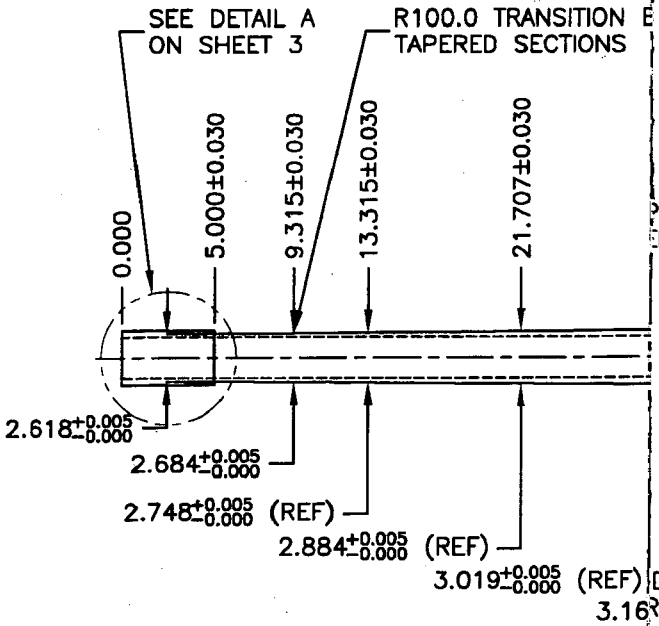
GENERAL NOTES:

1) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
2) MATERIAL: MANUFACTURED FROM D6009-129
   FINISHED LENGTH = 124.09±0.020
3) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
   PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
   PAINT OUTSIDE PER DART 005 4.2
4) PART IS SYMMETRIC ABOUT CENTERLINE.
5) RUN-OFF PART. BLEND OUT EDGE LONGITUDINALY, TRANSITION SHOULD BE SMOOTH.
6) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
7) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
8) SCRIBE DART PART NUMBER AND BATCH NUMBER IN THIS AREA WITH VIBRATING STYLUS.
9) INSTALL D2856-600-1009 ABRASION STRIP WITH A 0.13 (REF) GAP ON BOTTOM SIDE OF CROSSTUBE PER QSI 035.
10) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
11) APPLY A 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2896-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
12) INSTALL MS21920-30 CLAMPS (OR -32) WITH D3595-063-570 RUBBER CUSHIONS TO SECURE D2896-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE CROSSTUBE SUPPORT.
13) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 38964

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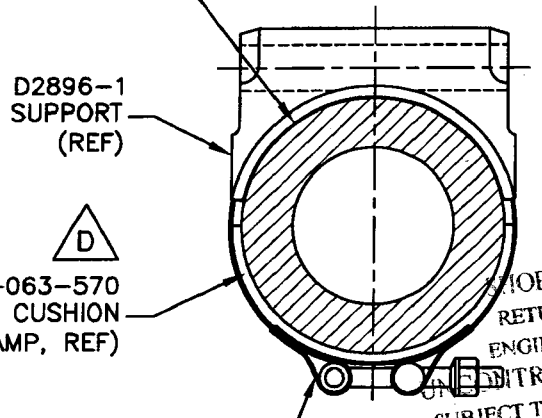


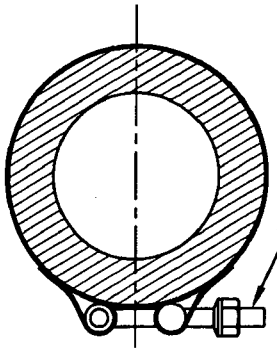


RELEASED
07.04.24

C 11
PPLY MAGNOBOND
N D2896-1 AND
THE CROSSTUBE

SECTION F-F
SCALE 2:5





SECTION E-E
SCALE 2:5

MS21920-28 CLAMP (RE

HOP COPY
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WITHOUT NOTICE
WORK ORDER
NO. 38964

WN BY PH	DART AEROSPACE LTD. HAWKESBURY, ONTARIO, CANADA	
ROVED	DRAWING NO. D412-664-243	REV. D SHEET 2 OF 3
	TITLE CROSSTUBE ASSEMBLY (412 HI AFT)	SCALE 1:10